

NON-PROVISIONAL  
UTILITY PATENT  
APPLICATION

FOR:  
ONE DEGREE - FOUR  
AXIS,  
GIMBAL FREE GYRO  
TOY

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## SPECIFICATIONS

### TITLE OF INVENTION:

One Degree Four Axis Gimbal Free Gyro Toy

### CROSS REFERENCE TO RELATED APPLICATIONS:

The inventor has determined that the invention has not been under "patent" or "patent pending" to the extent allowable through preliminary search.

### BACKGROUND OF THE INVENTION:

The toy production field has a definitive edge upon utilizing ideas of physics for introduction to the general public. Utilization of "gyroscopic" principle has been evinced within toys ranging from cars (US #4556396- circ.1985), to conveyor belt exaction of disks (US #4118031- circ.1975), including rotatable disks upon stationary vertical axis (US #01781333- circ.1930). Utilization of "centrifugal" force to elicit activation of specific toy element (US #6413144- circ.2000) has also been employed.

The developments of these toys are drawn from one discerning principle- single axle concentration and stability of axis. In specific "gyroscopic" principle, the axis employment range has been from one (in stabilization- US #5237450- circ.1992) to three (in standard rotary devices). However, when considering tendency of motion, specifically through pressure applied upon inertia points, the stability of axis becomes faulted and non-precession, thus to void effect in "gyroscopic" continuum.

## BREIF SUMMARY OF THE INVENTION

The device herein invented depends upon the "gyroscopic" principle as opposed to primary centrifugal force in the following manner: (1)The axle and subsequent housing components are constructed at inclination as opposed to a unilateral vertice; (2)The device is motivated by natural human wrist and arm tention as opposed to motorized activation ; (3)a point of inertia does exist, and may be relocated by tension and pressure upon the axle rod housing.

Through utilization of such "gyroscopic" principle, coupled with a four-axis gimbal free design, the device herein shall create a "helix" range from one to four, with the appearance of an additional two "helix" due to specified weight placement. The solution for problems of non-precession and continuum depends upon the skill of the user, and the construction can be imbibed for players of all ages.

## DESCRIPTION OF INVENTION

As weights and measures are integral to the activation of this device (FIG. I), the inventor has seen fit to include all applicable measurements as have been available at the time of conception to assist in the ease of construction for those who desire to investigate this device beyond the initial specification.

### I. Materials-Composition

1. An aluminum and/or steel alloy
2. A nylon polymer may be used in construction of entire device, or just upon specific areas as mentioned, infra. (\*)

4.1 Lockplate (w)

- a. diameter- 2.0
- b. distention rate from cone top base- 18.6 degrees (total from cone initiated diameter - 52.595 degrees)
- c. length of distention- 05
- d. width ratio: 05/ 025 distention

4.2 Lockplate (w)- two parts consisting of:

- a. 01 width flat plate (a) to connect to
- b. 05 length distention plate with 1.0 width flat plate (b)

5.1 Flywheel (x)-\*

- a. diameter- 3.0
- b. width- 03

5.2 Flywheel (x)- two parts consisting of:

- a. top mount plate- 01 width
- b. bottom fit to house lockplate

6.1 Flywheel (y)-\*

- a. diameter- 3.0
- b. width- 02

6.2 Flywheel (y)- two parts

- a. bottom mount plate- 01 width
- b. top flush with bottom of flywheel (z)- 01 width

7.1 Flywheel (z)-\*

- a. diameter- 2.0
- b. width- 02

7.2 Flywheel (z)- one part

- a. solid flush flywheel

8.1 Chain- four total sets

- a. each total length- 17.50
- b. tensile strength- 05oz. per 02
- c. air flow ratio single (solid/open)- 1/3

8.2 Chain increments- 2 sets of 2 differentiated  
measure

- a. set each line between 1.170 and 1.180 apart  
(1/2 in.)
- b. set doubling at the following:
  - b1. from top- 6.0 (2 and 1/4 in.),  
connect, 5.50 (2 in.), connect
  - b2. from top- 3.50 (1 and 3/8 in.),  
connect, 3.0 (1 and 1/8 in.), connect
- c. set single attachments at the following:
  - c1. for 6.0 at end of b1 connection and;
    - a. attach to balance (ref. no. 11a2)
  - c2. for 3.5 (1 and 3/8 in.) at end of b2  
connection, and;
    - a. attach to balance (ref. no. 11a1)  
and;
    - b. attach final 4.50 length (1 and  
6/8 in.) to balance (ref. no.  
11a2)
- d. For single chain attachments-all shall occur in  
uniform upon either the right or left side of  
lower bar attachments-

Description, cont'd.

9.1 Chain connectors and bars

a. diameter- 01

10.1 Double chain joinders-Cubes

a. cubic measurement at face- 045

9.2/10.2 Chain bar connectors/joinders-

a. Could supplement hooks for bar/cube attachments by doubling weight at bar/cube attachment areas (see tensile strength for evaluation)

11.1 Chain balances-\*

a. weight(s)- (a1)03oz./(a2)02oz

b. air flow ratio (solid/open)- (b1)3/1 (a2)1/1

11.2 Balance weights \*

a. construct of most any light weight nylon or aluminum, shall maintain solid/open air flow ratio as described.

Description, cont'd.

12.1 Axle housing unit for axle rod (y)

- a. total length- 3.50

12.2 Axle housing for axle rod (y)

- a. top area of housing- 06 diameter, 06 length
- b. mid-area of housing- 045 diameter, 045 length
- c. bottom area of housing- 085 diameter, 1.950 length (05 threadable allowance for outer handle attachment)
- d. 07 threaded open rod for access to weight ball at upper area of bottom housing unit
- e. housing shall be inserted into outer handle by means of threaded/threadable rods in increments of 5.0, 7.0, 9.0 lengths.

Description, cont'd.

## ASSEMBLY

Assembly of the device is simple, and is effected by means of easily accessible components. To ensure proper format/function, certain basic principles of welding/solder shall be applied to the following elements:

1. bond flywheel (y)(and mountplate) and (z) to top solid area of axle rod (x)-
2. attach weight ball to measured end of axle rod (y)- (may thread if necessary)
3. attach inclination cone to measured ends of axle rod (x) and axle rod (y)
4. bond lockplate to inclination cone
5. bond mountplate to flywheel (x)
6. bond specific washers as indicated

Please refer to FIG. II drawing for overview of process per numerals as listed below.

13. Lockplate (ref. no. 4.2) distention plate top surface shall contain eight (8) plate locks gaged at (a) 02 width, (b) 05 total vertical length, (c) 06 horizontal top length, (d) 03 horizontal bottom length-

14. Plate locks shall contain centre punch at a measurement of 025 diameter, spaced at 08 apart, and each centre punch shall be cased by rubber housing not to exceed 01 diameter at center, eased to 025 at exits of centre punch.



Description/Assembly, cont'd.

15. Plate locks and rubber housing total top width shall not exceed 04cm.

16. Plate locks shall begin 03 from outer edge of lockplate, and recede no farther than 07 from outer edge of lockplate

17. Total inner open housing of axle rod (x) shall not exceed 0125 diameter, nor shall open axle rod (x) length exceed 05.

Please refer to FIG. III drawing for overview of process per numerals as listed below:

18. Flywheel (y) (ref. no. 6.2), bottom mount plate shall contain three (3) 05 by 1.0 indentations, spaced at 1.0 apart

19. mount plate indentions shall begin 05 from outer flywheel edge, and not recede farther than 1.0 from outer flywheel edge.

20. Flywheel (x) (ref. no 7.2), top mount plate shall contain three (3) 05 by 1.2 indentions, spaced at 08 apart- begin and end same as (3).

21. Flywheel (x) shall contain eight (8) entrance points from .02 from base of flywheel (x).

22. Flywheel (x) bottom lock insertion area and entrance points shall contain eight (8) indentions/centre punch coinciding with lockplate/entrance measurements at 1.17750 (see FIG. II, 2)

23. Flywheel (x) centre punch shall continue 02 beyond lockplate and rubber housing at each inner plate lock.

Description/Assembly, cont'd.

Please refer to FIG. IV for overview of process per numerals as listed below:

24. Bond lockplate to inclination cone
25. Assemble inclination cone assembly to axle rods (x) 1.0 (3/8 in.) insertion and (y) 1.0 (3/8 in.) insertion
26. Bond flywheel (y,z) to axle rod (x)
27. Attach flywheel (x) to axle rod (x)-freewheel
28. Complete axle rod (x) assembly and cap
29. Insert complete axle rod (x,y) assembly into axle housing through loose washer (01 width at top)
30. Bond weighted ball to end of axle rod (y) (include one (7a) loose washer and 2 (7b) bonded washers at 01 width each
31. enclose axle housing (12.2d)
22. Attach chains